

Know Your Lidar Data

Assessing the Accuracy/Quality
Integrating Other Sources of Data
Extracting Information and Features From
Lidar Data

Karen Kwasnowski



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Today's Topics

- ▶ What does Lidar data look like?
- ▶ Errors in the Lidar data
- ▶ Integrating other datasets in with the Lidar
- ▶ **Extracting Information from Lidar**



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Extracting Information

- ▶ How valuable is that information?

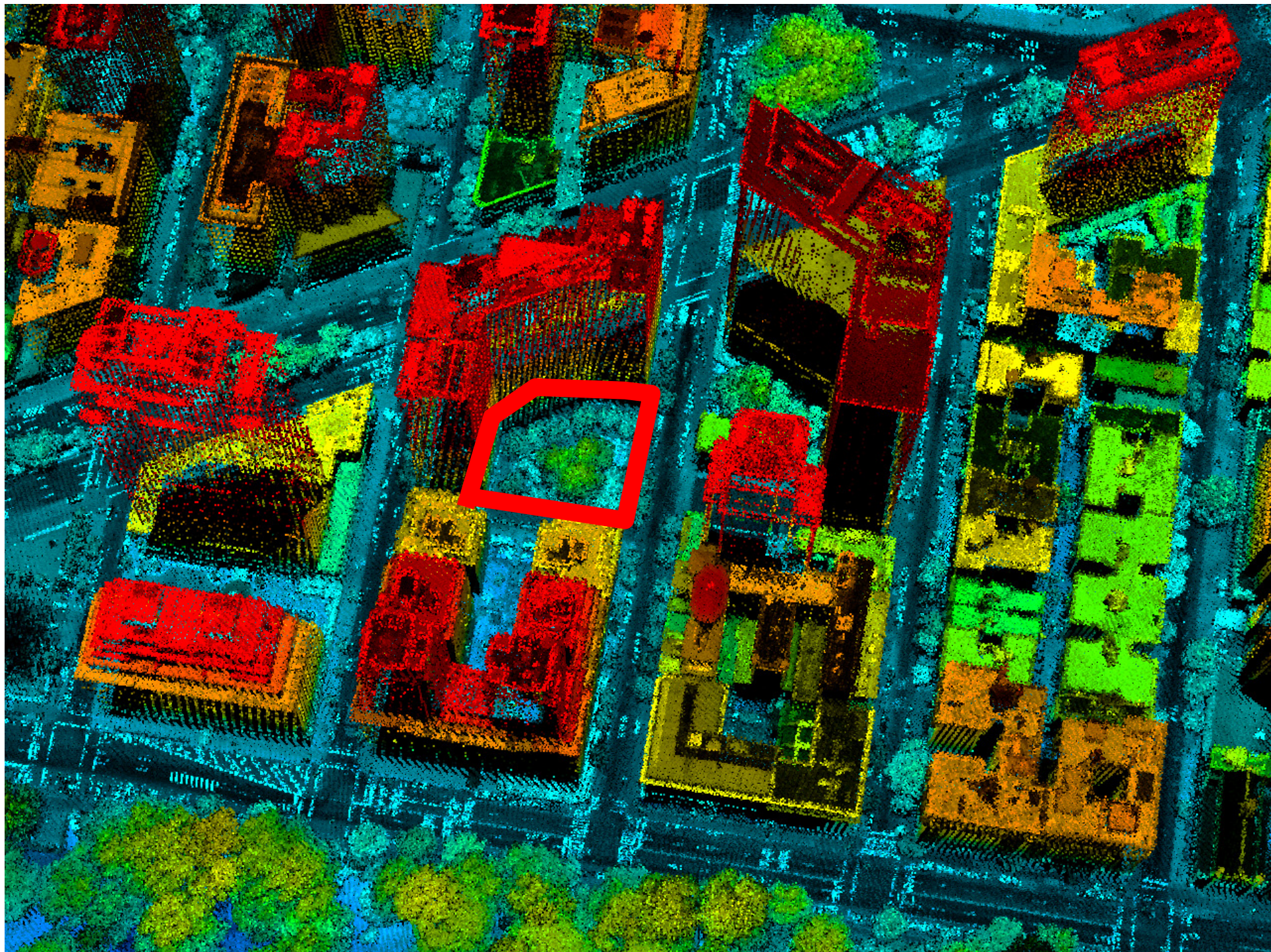




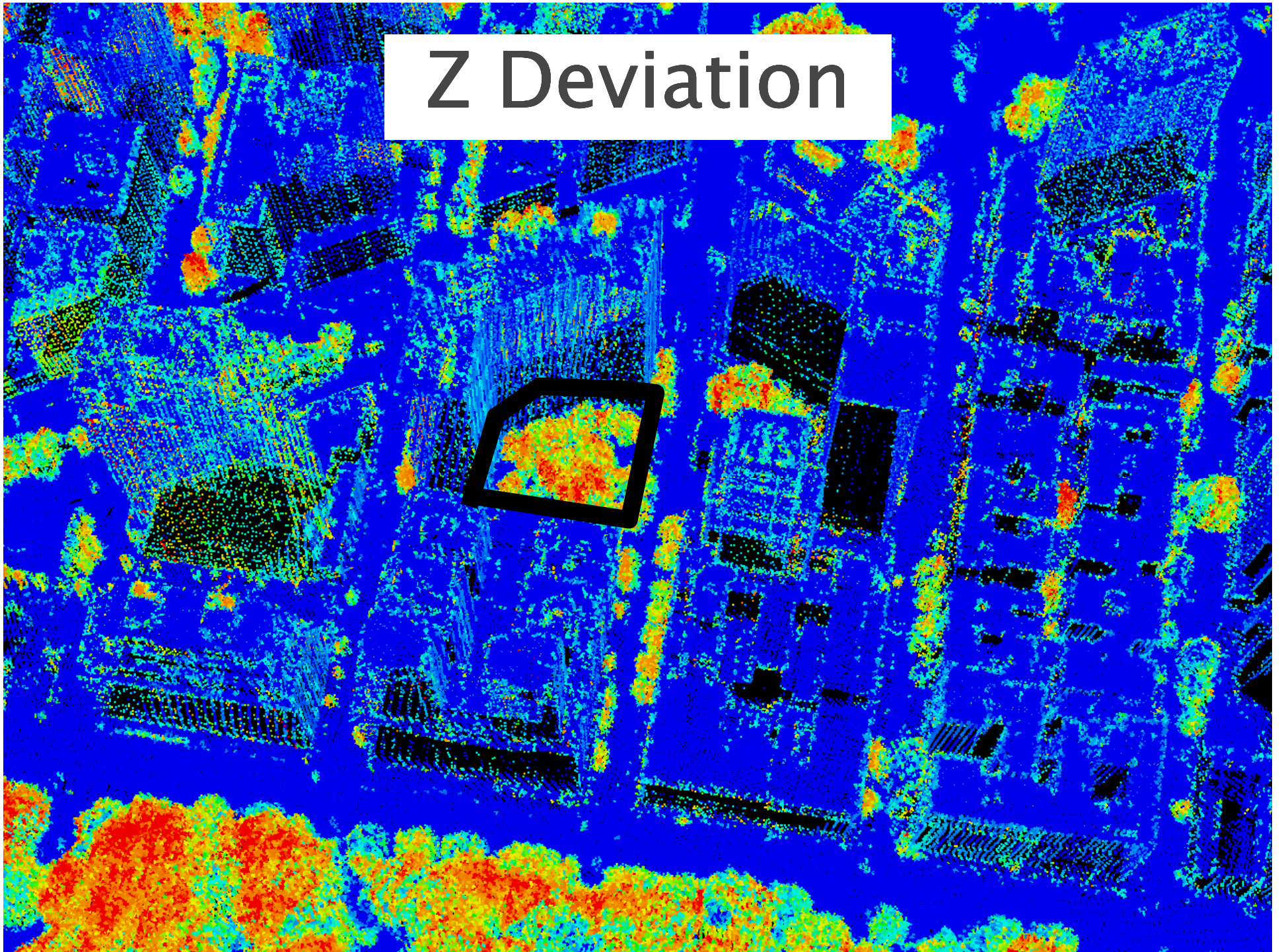
nDSM





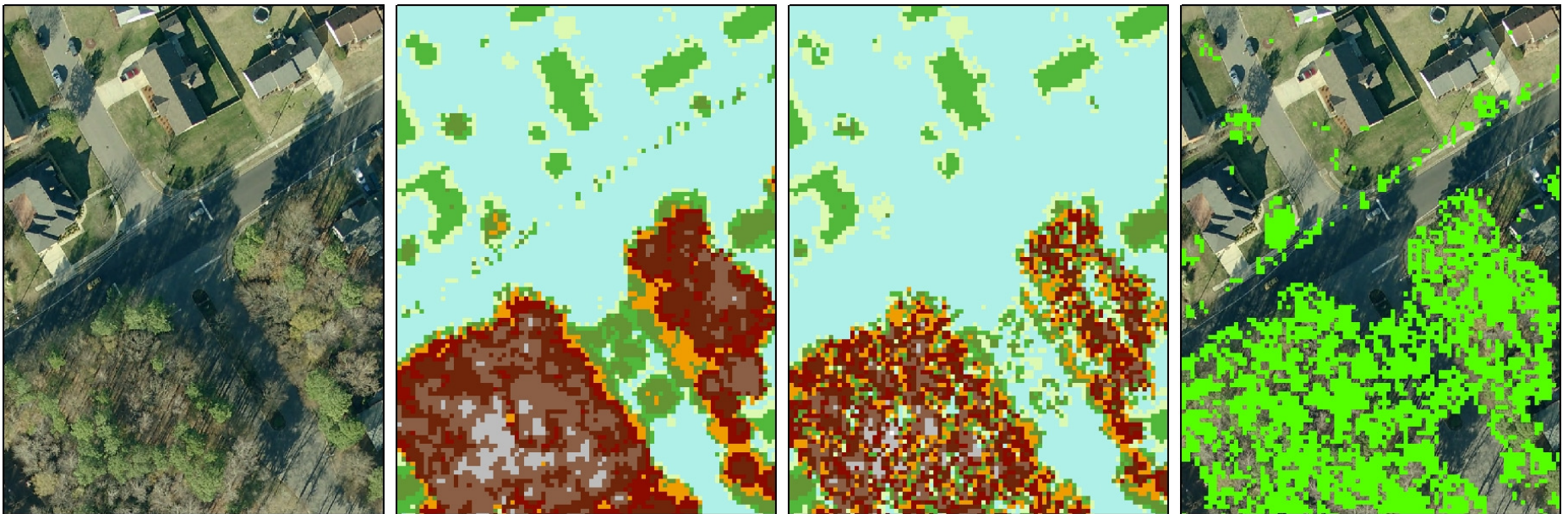


Z Deviation



Extracting Information

- ▶ Simple Vegetation Mapping



First Return – Last Return = Vegetation



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Extracting Information

- ▶ More Complex Vegetation Mapping:
- ▶ Tree Canopy **Rule Set:**
 - High things (nDSM)
 - Multiple returns (mean # returns)
- ▶ *False positives include:*
 - *Powerlines, some irregular rooftops, towers, awnings, decks, irregular structures*
- ▶ *Low vegetation (shrubs) and grass are difficult*
- ▶ *Leaf off collections not ideal.*



Extracting Information

- ▶ Impervious Surface **Rule Set:**
 - High or low (Buildings or pavement)
 - Single returns (mean # returns)
 - Not vegetation
 - Signal Intensity **
 - Variability
 - Resolution
- ▶ *Imagery is higher resolution*



Extracting Information

- ▶ Problems with Lidar Data
 - Raster data are from points
 - Statistical value of all points within a cell
 - Resolution is relatively coarse (~1 m)
 - Interpolated values in NODATA cells (voids)
 - Context can be critical for feature ID
 - Image analysis can be critical
 - Higher resolution, Infrared

Extracting Information

Even More Complex Analysis

OBIA

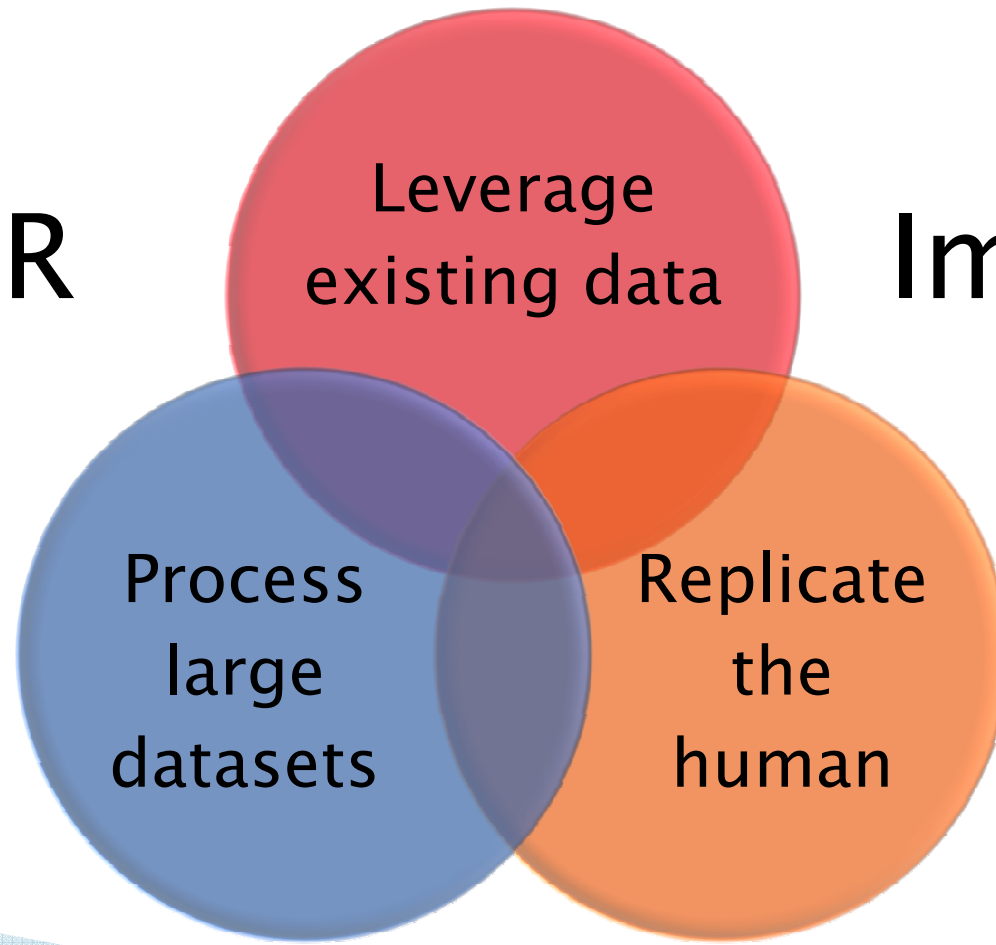


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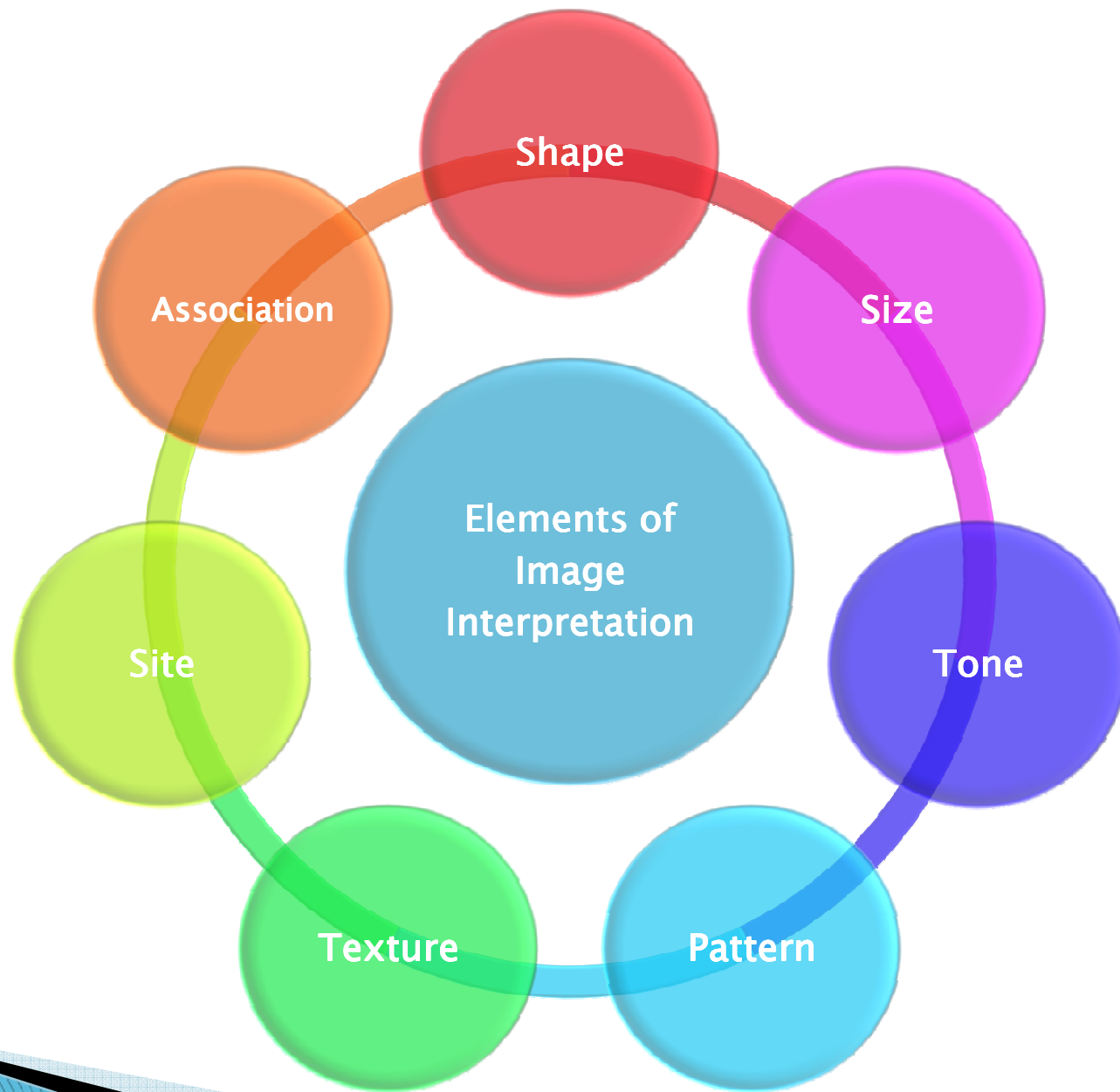
Extracting Information Data Fusion

LiDAR

Imagery

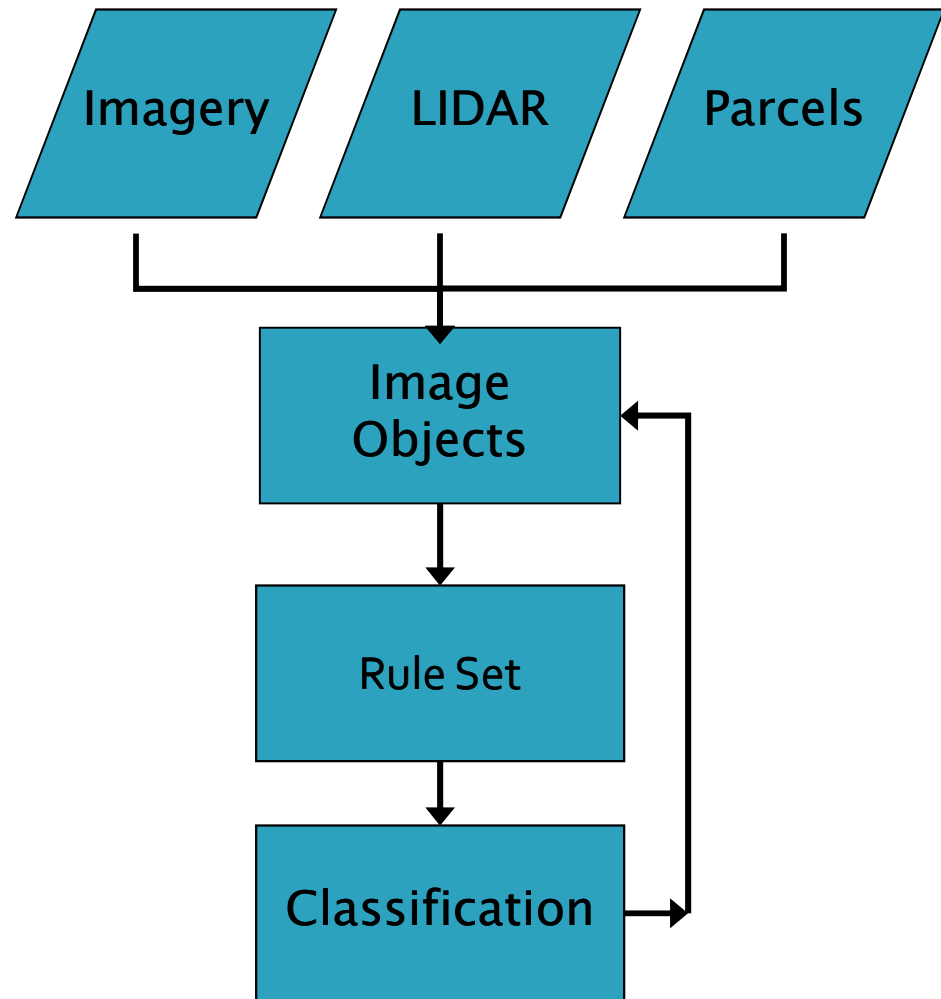


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Extracting Information

► OBIA Data Fusion



Extracting Information

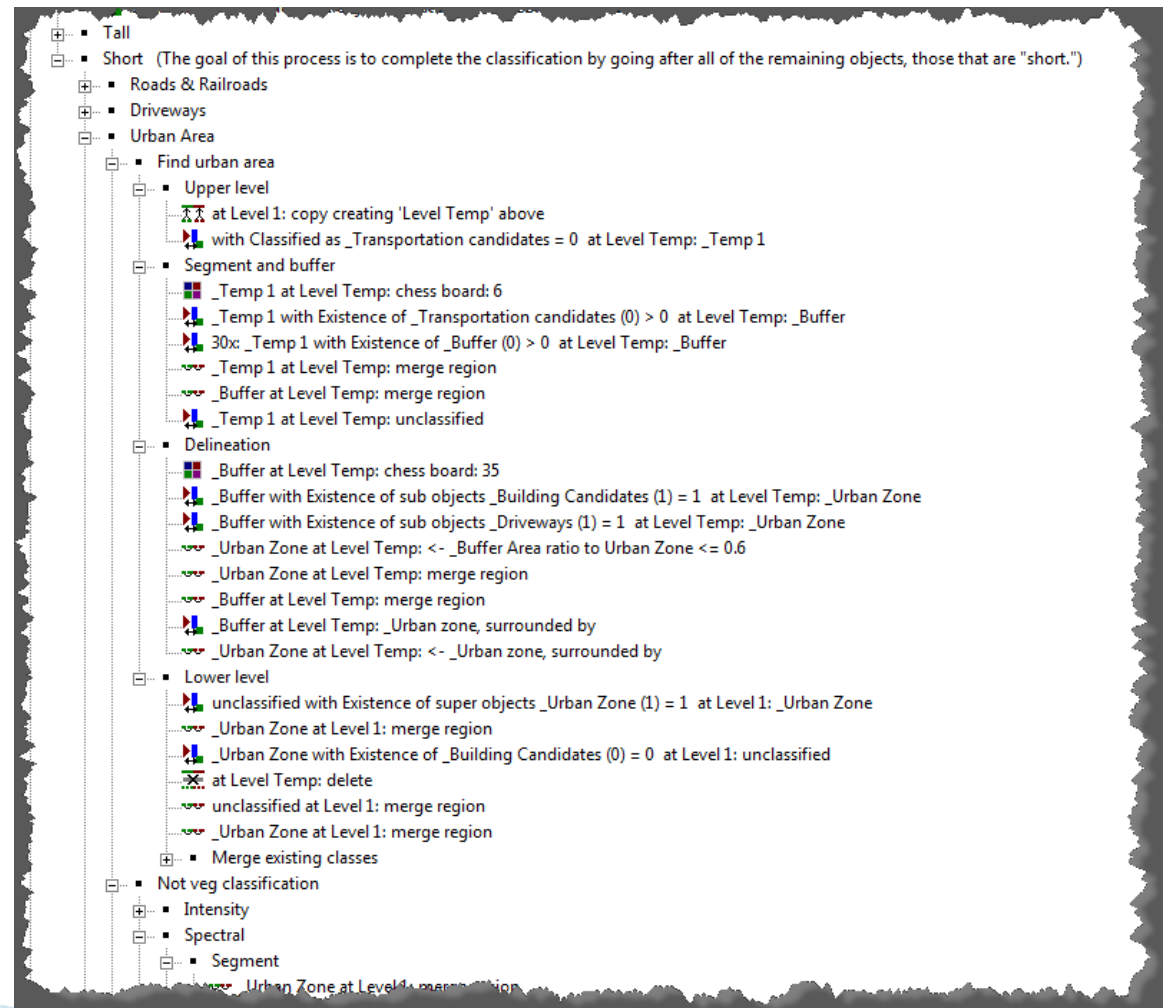
Rule Set

■ What is a Rule Set?

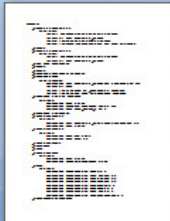



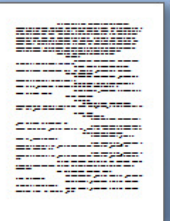
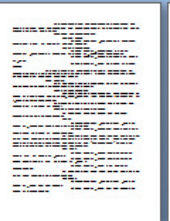



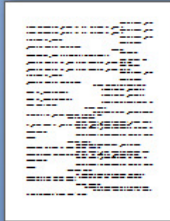










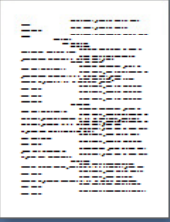


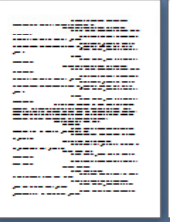



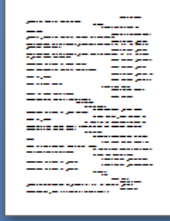

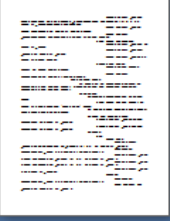

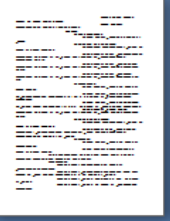

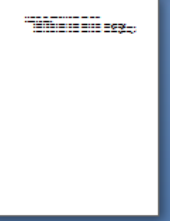


- A rule set is a set of Processing steps
- It is stored in a Process Tree

■ Rule Sets Define:

- which Image Objects shall be processed with which Algorithm and under which Condition

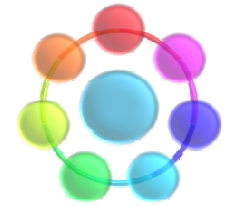


Rule Set

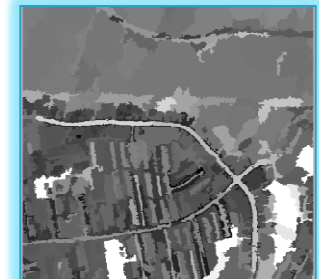
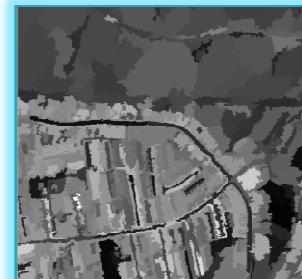
								
								
								
								



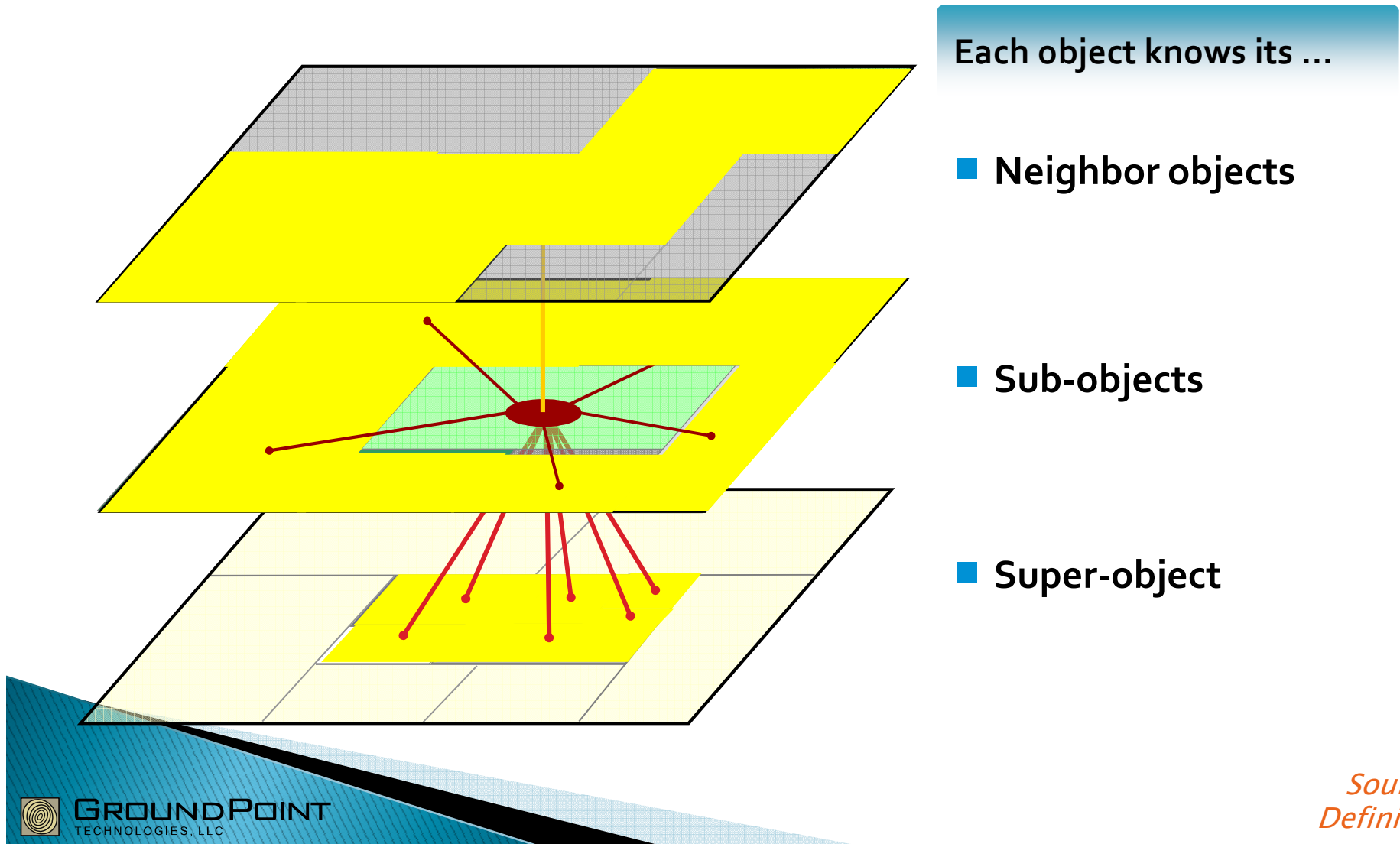
Properties of Image Objects



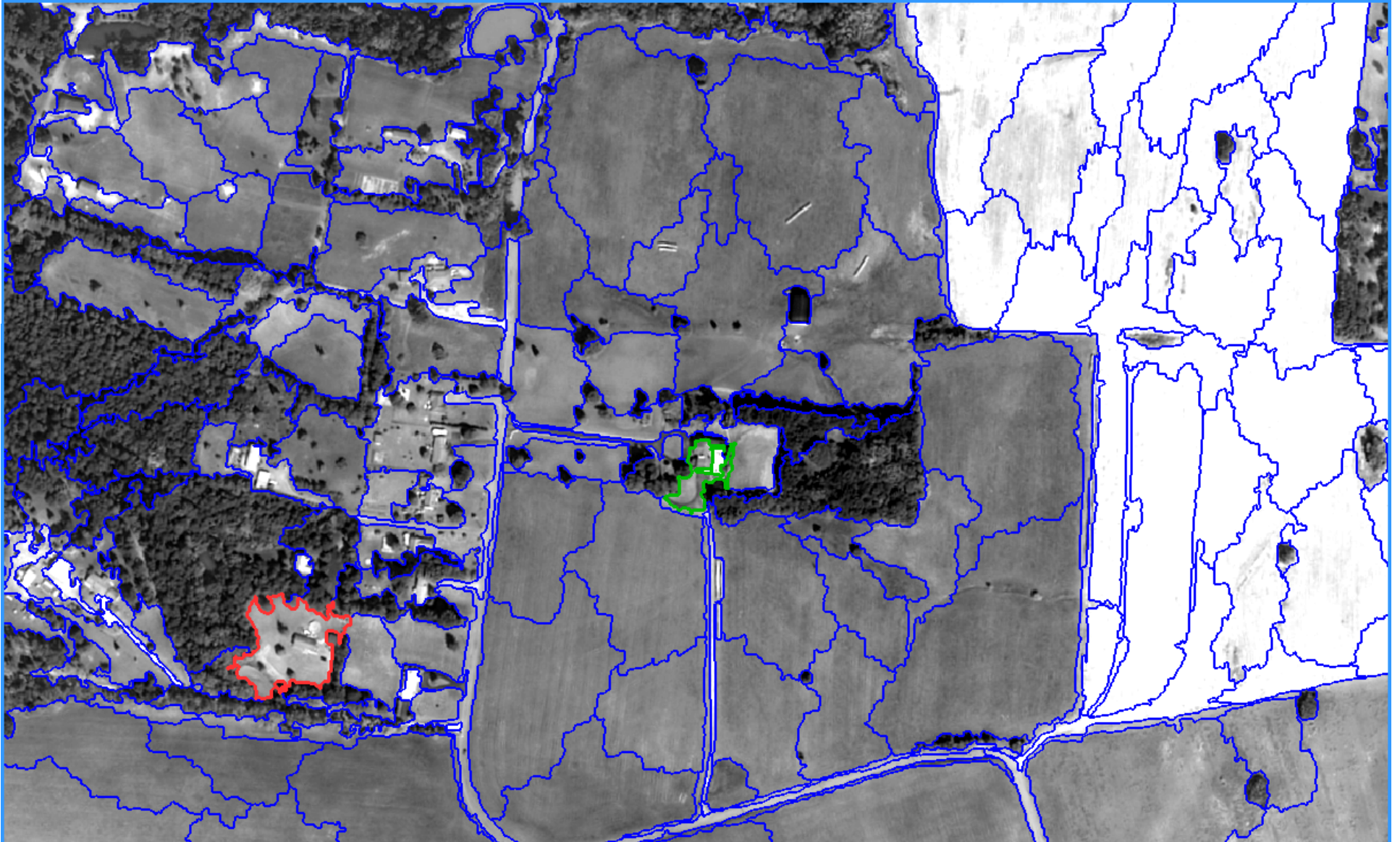
- ▶ Color
 - Mean, Ratio, Standard deviation
- ▶ Shape attributes
 - Size, Length, rectangular fit
 - long and skinny vs fat and round
- ▶ Texture attributes
 - Smooth, rough
- ▶ Relations between objects & classes
 - Mean difference to neighbors



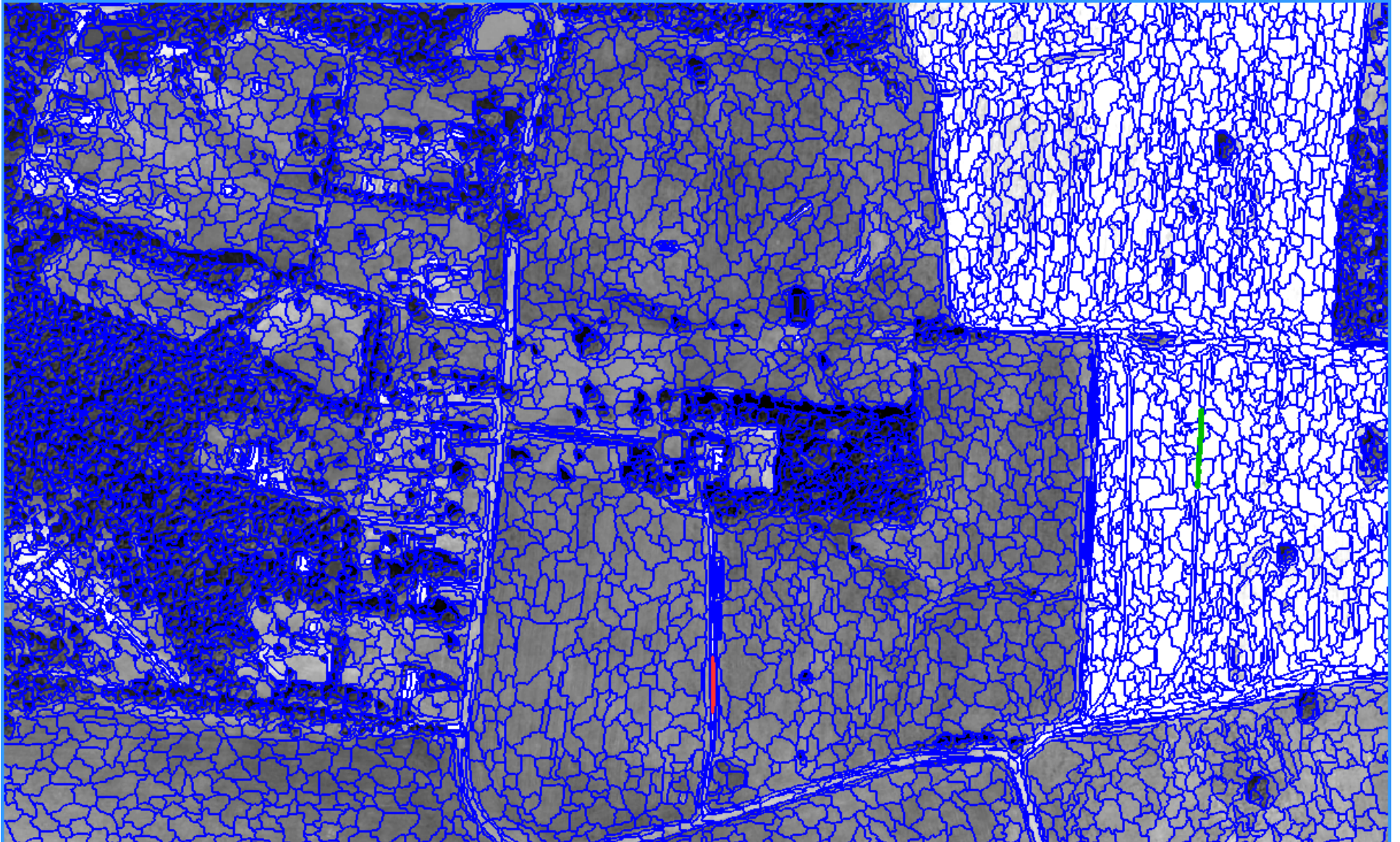
Network of Image Objects



Coarse Scale Segmentation



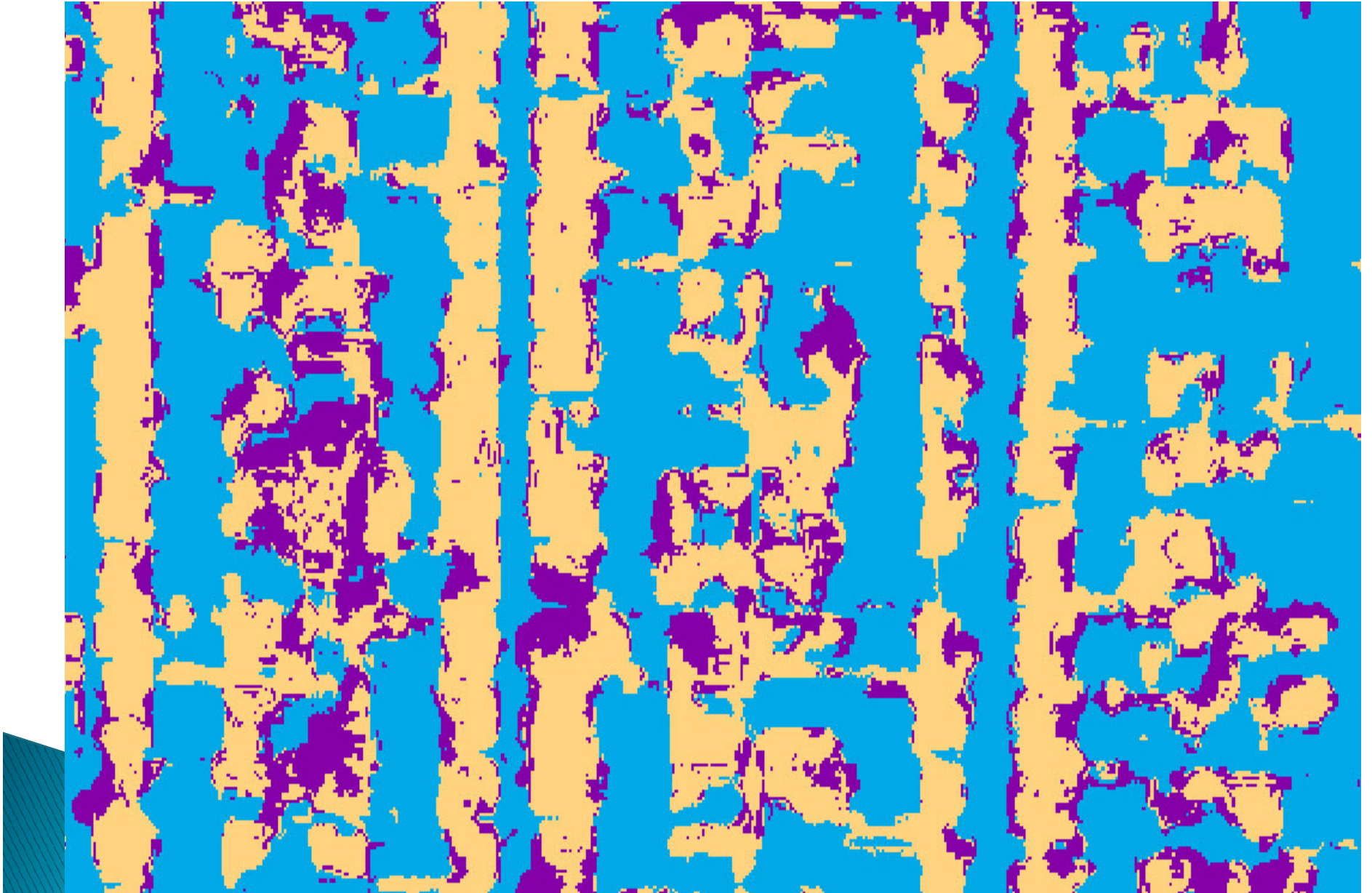
Fine Scale Segmentation



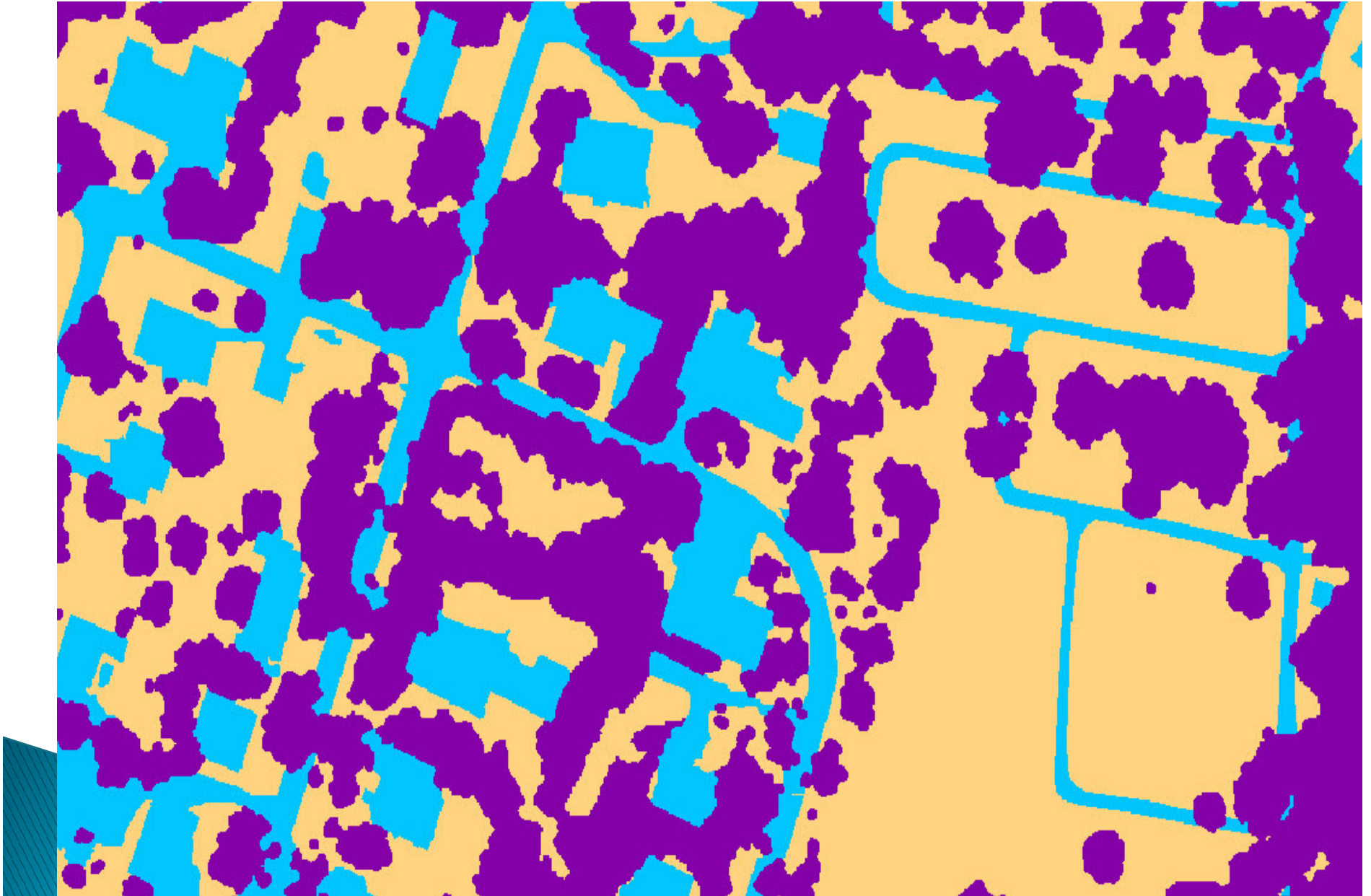




Accuracy vs Quality



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